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NOTES ON GEOGRAPHIC DISTRIBUTION

Poecilia sphenops Valenciennes, 1846 (Cyprinodontiformes, Poeciliidae): New record in rio Sergipe basin, northeastern Brazil

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ABSTRACT: The present paper reports the first record of non-native species *Poecilia sphenops* Valenciennes, 1846 in northeastern Brazil in rio Sergipe basin, a coastal drainage of the Sergipe state. This species was collected at seven sites in the Caatinga biome. The cause of the introduction is not known, but we believe it is a direct impact of the aquarium trade through the aquarium dumping performed by hobbyists. The presence of *P. sphenops* in natural waterbodies increases concerns for interference with native ecosystems, and the risk of eggs predation in native species with low fecundity and absence of parental care such as *Astyanax lacustris* and *Serrapinnus heterodon*, competition and hybridization with the native poeciliid *Poecilia vivipara*.

Poeciliidae is the most important family of Cyprinodontiformes, represented from eastern United States to South America and Africa including Madagascar (Nelson 2006). Three subfamilies are recognized: Aplocheilichthyinae (22 species), Procatopodinae (61 species), and Poeciliinae (273 species) (Eschemeyer and Fong 2013). Members of the subfamily Poeciliinae have a modified anal-fin with a copulatory organ called the gonopodium, which makes internal fertilization possible (Parenti 1981) (see Figure 1, inset). Embryos develop internally in this subfamily, varying from matrotrophic to lecitotrophic types (Kunz 2004). Owing to their attractive appearance, some species are important in the aquarium trade (Axelrod *et al.* 2007), where, in Brazil, the most common species being the guppy (*Poecilia reticulata* Peters, 1859); the black molly (melanic variety of *Poecilia sphenops*); the swordtail (*Xiphophorus helleri* Hekel, 1848); the platyfish [*X. maculatus* (Günther, 1866)]; the variable platyfish [*X. variatus* (Meek, 1904)], and the sail-fin mollies [*P. velifera* (Regan, 1914), and *P. latipinna* (Lesueur, 1821)] (Alves *et al*. 2007; Magalhães and Jacobi 2008). In addition to the aquarium trade, it is not uncommon for some species to be used as biological controls of mosquitoes such as *P. reticulata* (Sherley 2000; Chandra *et al.* 2008).

FIGURE 1. Adult male of non-native *Poecilia sphenops* (31.8 mm SL) and tip of the modified anal-fin (gonopodium). Scale bar = 1 mm.

The molly *Poecilia sphenops* occurs from Mexico to Colombia (Lucinda 2003). Presents greater plasticity and survival at different gradients of temperature (Báron *et al.* 2002; Hernández and Bückle 2002; Evans *et al.* 2011). This paper reports the first record of non-native *P. sphenops* in water bodies at northeastern Brazil.

Poecilia sphenops (Figure 1) was collected at seven sites in the rio Sergipe basin, Sergipe state, northeastern Brazil (Figure 2) under SISBIO permit # 20104-1. This is a small coastal drainage of Sergipe state, limited to the north by São Francisco and Japaratuba basins, and south by Vaza-Barris basin (Rocha 2006). The region of sampled sites is typical of the Caatinga, a unique Brazilian biome, where the climate is semiarid and the rivers are subject to hydrological stress (Prado 2003). Voucher specimens used in this study are deposited under their respective catalogue numbers CIUFS 581, CIUFS 589, CIUFS 647 and CIUFS 681, in the Universidade Federal de Sergipe fish collection (CIUFS).

Trawl (5 mm mesh) and sieve (4 mm mesh) were deployed in shallow waters during the day (four persons during 20 minutes), catching 348 specimens of *P. sphenops*. Fishes were euthanized (Borsky and Hodson 2003), fixed in 10% formalin and later stored in 70% ethanol (Uieda and Castro 1999). It was syntopic to native species the lambari *Astyanax lacustris* (Lütken, 1875), piaba *Serrapinnus heterodon* (Eigenmann, 1915), barrigudinho *Poecilia vivipara* Bloch and Schneider, 1801 and the cará *Geophagus brasiliensis* (Quoy and Gaimard, 1824). Two other non-native species were recorded at the same sites: guppy *Poecilia reticulata* Peters, 1859; and Nile tilapia *Oreochromis niloticus* (Linnaeus, 1758).

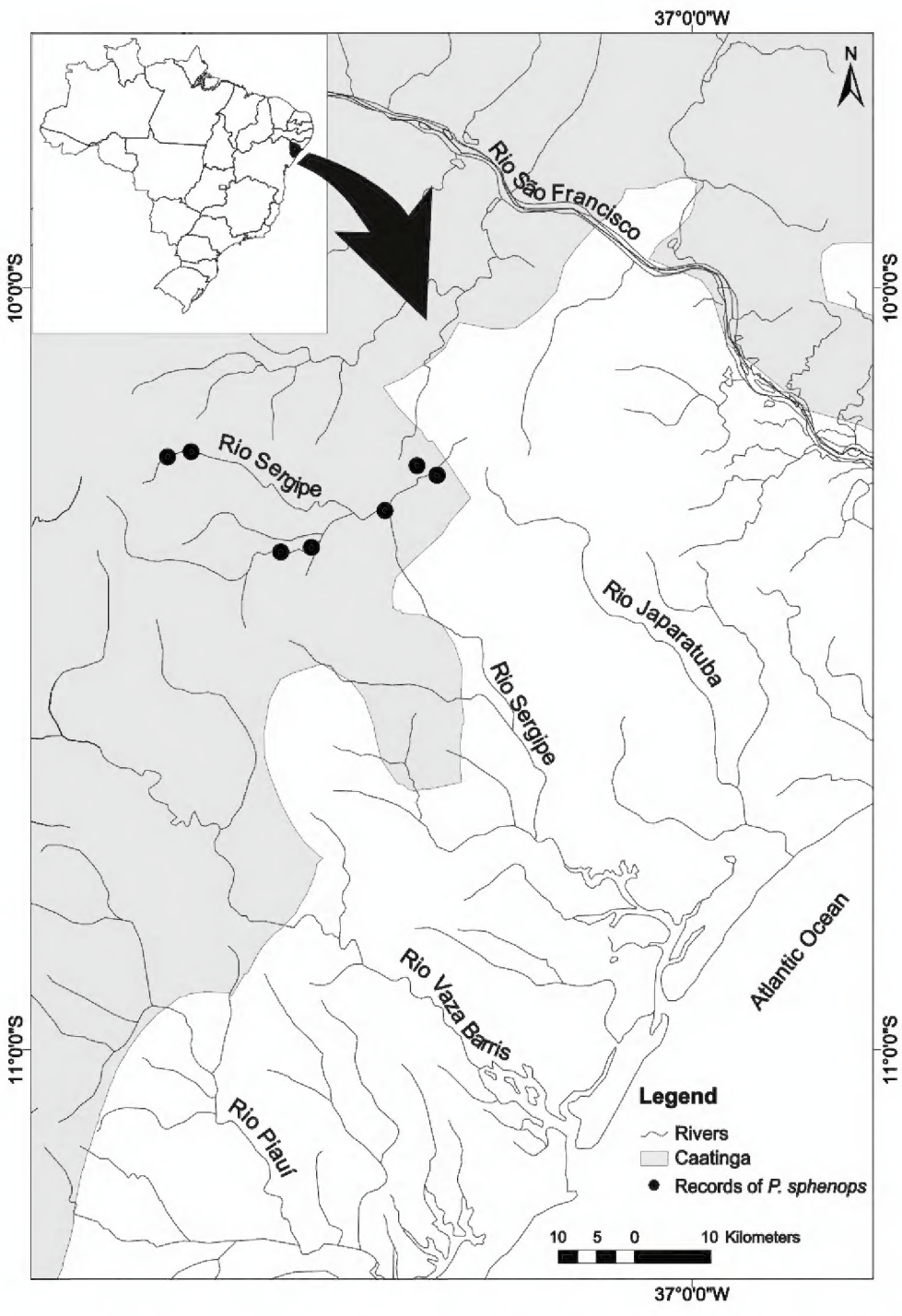

FIGURE 2. Map of records of non-native *Poecilia sphenops* in rio Sergipe basin, Sergipe state, northeastern Brazil.

The collection included 204 females (13.70 – 47.70 mm SL), 78 males (13.70 – 44.12 mm SL) and 66 juveniles (8.00 – 13.52 mm SL). The analysis of some ovaries (n= 50) revealed reproductive females and embryos in distinct developmental stages (*sensu* Haynes 1995). These records and the presence of juveniles suggest natural recruitment of *P. sphenops* in rio Sergipe basin.

The presence of *P. sphenops* in Brazil was recorded in Rio de Janeiro state at rivers in the urban region of Japarepaguá at Rio de Janeiro city (Bizerril and Silveira-Primo 2001), and Minas Gerais state at Paraíba do Sul, and São Francisco basins (Alves *et al.* 2007; Chaves and Magalhães 2010). These introductions were associated with the aquarium trade as people gave up the hobby and released them into public waters through the aquarium dumping (Bizerril and Primo 2001; Padilla and Williams 2004; Alves *et al.* 2007; Chaves and Magalhães 2010). *Poecilia sphenops* probably reached the rivers of rio Sergipe basin the same way. Alternatively, owing to its reputation as a voracious fish, it was released to control for mosquito larvae. The highly larvivorous capacity of fish belonging to Poeciliidae family led to the introduction in several countries (Sherley 2000; Chandra *et al.* 2008), wherein fishes find suitable conditions they can become invasive (Puth and Post 2005).

The possible establishment of *P. sphenops* should be verified to evaluate its effects on native species with low fecundity and absence of parental care such as *A. lacustris* and *S. heterodon*, and especially *P. vivipara*, a species of same genus and similar life history attributes. It is generally acknowledged that closely related species compete for similar resources (Hutchinson 1959), and invasive species, especially cultivated ones, selected for their resilience, are more prone to be invasive, and may outcompete native species using the same niches (Alves *et al*. 2007).

The hybridization between invasive and native species is a threat to conservation. Genetic introgression cannot be dismissed because hybrids between native *P. vivipara* and non-native *P. mexicana* were already recorded by Courtenay and Meffe (1989), and the same may be true with the invasive *P. sphenops* and the native *P. vivipara*.

This case deserves attention since there are records of establishment of *Poecilia* with consequences to native fauna (Sherley 2000; Evans *et al.* 2011). The probable establishment of *P. sphenops* in rio Sergipe basin is of concern, because where this poeciliid become established, they tend to disperse naturally and colonize new areas, and these areas are mangroves of rio Sergipe estuary. According to Petrescu-Mag *et al*. (2008), this species are capable of surviving in coastal brackish waters. Finally, the presence of *P. reticulata*, another non-native poeciliid species in Sergipe's drainages also needs to be investigated.

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